

Memorandum

To : Jake Mackenzie, Assistant Director
Pest Management, Environmental Protection
and Worker Safety

Date: January 24, 1978

Place: Sacramento

Telephone: 5-8474

From : **Department of Food and Agriculture** - Keith T. Maddy, D.V.M., M.P.H.
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Subject: Human Health and Safety Problems with Phosphate Cotton Defoliant in California
with Emphasis on 1976 and 1977

Since their introduction, there have been numerous complaints of adverse human health effects following inhalation of the residues of phosphate defoliant as they drifted off treated fields. (Sometimes this has been complicated by adverse health effects attributed to exposures to Paraquat. This is covered in a separate report.) This is a particular problem for the first 48 hours after treatment and especially during periods of air stagnation. It was initially believed that the removal of excess butyl mercaptans from these defoliant would eliminate the problems. This was largely accomplished for DEF by Mobay Chemical Company by the beginning of the 1974 season. Mobil has been somewhat less successful; even as late as the 1977 season significant quantities of butyl mercaptans were still present in some samples of the formulated product. Although DEF, as sold (since 1975) has not had a foul odor when the container is opened, however, such an odor usually develops over a treated field within 24 hours. Mobil's Folex has only a modestly foul odor when opened; after application its odor is now more pronounced than that of DEF.

DEF has always been the major use product of the two. Since the 1975 season had resulted in such few foul odor problems, it was then assumed that the reduction in the content of butyl mercaptans, primarily in DEF, had solved the problems. It became evident in 1976 with the substantial resurgence of problems, even though Folex by then also had a lower level of butyl mercaptans, that the odor problem involved field generation of more odors complicated by air stagnation and spraying too close to human habitations, particularly schools.

(Field followup of numerous complaints made in 1976 was not possible because all available State staff members were investigating the poisoning incident of 118 field workers in Madera with Torak.)

Below is a summary of information on the phosphate defoliant problem during the 1976 and 1977 season based on direct complaints to this Department, the State Department of Health and to County Departments of Agriculture and Health.

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Imperial

There were many complaints of foul odor, human illnesses involving nausea, vomiting, and respiratory irritation during both 1976 and 1977, but 1977 resulted in the most complaints. Physicians reported that the Brawley area was a problem area both years. DEF and Folex were each identified as causing problems.

Riverside

There were foul odor problems in both the Palo Verde and Coachella valleys. The problems were worse in 1977 when compared to 1976. Both DEF and Folex were separately identified as causing foul odor problems.

Kern

In 1976 there were numerous complaints. Physicians in the Lamont and Delano areas treated numerous patients whose illnesses were attributed to phosphate defoliant exposure. One spraying near (1/2 mile) the Bakersfield State College resulted in numerous illnesses and the going home of numerous students and staff members.

In 1977 there were few complaints and, of these, Folex seemed to be involved as the cause.

Almost no days of air stagnation, and compliance with guidelines to avoid spraying near previously identified problem areas were given as reasons for improvements in 1977.

Tulare

There were many complaints of odor problems in 1976. A number of human illnesses were reported that year. In 1977 there were fewer problems and this was attributed to better weather, a decrease in the use of DEF and Folex, use of less of it near heavily populated areas, and more overall use of chlorates.

Kings

There were many odor and illness problems reported in 1976 and 1977. DEF and Folex were each identified as causes of incidents. Folex appeared to smell the worst from the time of application, but by the second day, DEF also smelled foul.

There were said to have been fewer complaints in 1977 and these occurred on days of air stagnation. The County Health Department received about 63 human health complaints distributed over a 30-day period; diverse areas of the county were included, and these were said to have involved difficulty in

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breathing and asthma-like attacks. Although there were fewer odor-only complaints, there were more complaints of human illness.

Fresno

There were numerous complaints about foul odors and adverse health effects in 1976 and even larger numbers in 1977. Several petitions and complaints signed by numerous individuals were directed toward the County and State Health Departments and our Department.

It appears that the geographic and possibly the consequent air movement conditions in the Dos Palos area, near the Fresno and Merced county lines, result in excessive concentrations of phosphate defoliant there each Fall. There are numerous complaints of foul odors and adverse health effects in this area each year.

There were reports that Folex smelled the worst in 1977.

Merced

There were numerous complaints from the Dos Palos area during both 1976 and 1977. There were fewer complaints from other areas of the county. Folex was reported as smelling the worst in 1977.

Madera

In 1976 there were a large number of foul odor and adverse health effect complaints. They were fewer in number in 1977. Folex was reported as smelling much worse than DEF in 1977. In 1977 more calls were received by the County Health Department involving nausea, and upper respiratory problems following defoliant applications than in 1976. Physicians report that some of their patients leave the area during defoliation season; others have moved away permanently.

Discussion

It has become evident in the past two years that many complaints of odor and illness problems attributed to the cotton defoliants are no longer made to agricultural commissioners' offices but are made directly to local health departments, the State Health Department, and our Department. Some of the persons lodging complaints state that they think that commissioners will not or cannot do any more to correct the problem at the local level.

California law provides that pesticides are not to be registered if their adverse effects outweigh their benefits and particularly if there are adequate alternate pesticides available. Also, if pesticides are not confined to their application site a violation of our regulations occurs. State and local health officials and members of the general public are becoming increasingly critical of our continued registration of the phosphate defoliants.

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Pesticides, in general, are coming under increasing scrutiny in California, and not solving the odor problems of the phosphate defoliants is becoming an unnecessary liability to the Department in justifying its program of responsible control of pesticides.

Although we think the major health problem is discomfort and a nauseous and a wheezing type of illness, attributable to inhalation of the foul odor, we have difficulties assuring some concerned and well-informed citizens that adverse effects such as cholinesterase inhibition, liver damage, delayed nerve damage, brain damage, and lung damage are not occurring as long as they can smell these pesticides in and around their homes; these effects might result from exposure to phosphate defoliants or butyl mercaptans if the dose were quite substantial.

Neither Mobay or Mobil have solved the odor and consequent human health problems of their products. It is difficult to recommend continued use of these products and particularly difficult to permit the continued use of Folex.

The use of Nalcotrol has reduced the drift problems of these products to nearby fields with a consequent reduction in crop damage and residue problems. However, it has not affected the odor problem. In fact, it appears to have made it worse because the Nalcotrol reduces the evenness of application and so an additional application of the phosphate defoliant often has to be made.

Recommendations to Consider

1. Take registration action that eliminates the use of Folex in 1978.
2. Hold hearings early in 1978 to obtain public input on proposed restricted materials regulations additions to read somewhat as follows:
 - "a. No applications of phosphate defoliants on cotton shall be made within one mile of (1) any area zoned as a residential area that is occupied by people, (2) any hospital, or (3) any school.
 - b. Longer distances than one mile may be specified by the Director from residential areas, schools, and hospitals as areas where the phosphate defoliants shall not be used, if it appears that special geographic and air movement conditions in that area require this in order to protect the public from adverse effects of these pesticides. (It appears that there may be a need for a non-use zone of several miles in radius from the center of Dos Palos.)
 - c. No applications of paraquat or phosphate defoliants on cotton shall be made on any day until the local air pollution authorities have reported that it is not a "no burn" day."

Also, the previously proposed guidelines on the use of drift-reducing agents and nozzle specifications should be proposed as possible regulations.